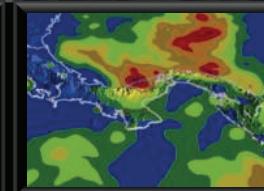




# Space Launch System (SLS) Program NASA Research Announcement (NRA) Advanced Booster (AB) Engineering Demonstration and Risk Reduction



Space Launch System



Christopher M. Crumbley, Chairperson  
Kellie D. Craig, Contracting Officer  
NASA Marshall Space Flight Center  
December 8, 2011



- ◆ The Congress approved and the President signed the National Aeronautics and Space Administration Authorization Act of 2010.
  - Bipartisan support for human exploration beyond low-Earth orbit (LEO)
  
- ◆ The Law authorizes:
  - Extension of the International Space Station (ISS) until at least 2020
  - Strong support for a commercial space transportation industry
  - **Development of Orion Multi-Purpose Crew Vehicle (MPCV) and heavy lift launch capabilities**
  - A “flexible path” approach to space exploration, opening up vast opportunities including near-Earth asteroids and Mars
  - New space technology investments to increase the capabilities beyond Earth orbit (BEO)



*This rocket is key to implementing the plan laid out by President Obama and Congress in the bipartisan 2010 NASA Authorization Act.*

— NASA Administrator Charles Bolden  
September 14, 2011



*Delivering on the Laws of the Land ... and Obeying the Laws of Physics*



# SLS Is a National Asset for Multiple Stakeholders and Partners





# SLS Driving Objectives



- ◆ **Safe: Human-Rated**

- ◆ **Affordable**

- Constrained budget environment, with no planned escalation.
- Maximum use of common elements and existing assets, infrastructure, and workforce.

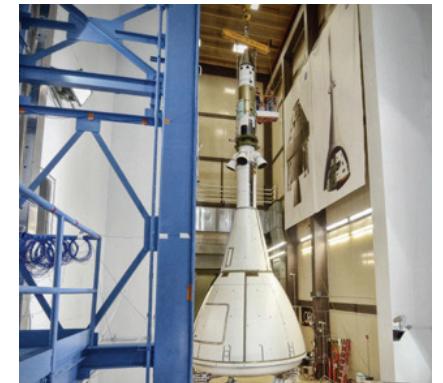


- ◆ **Initial capability: 70 tonnes (t), 2017–2021**

- Serves as primary transportation for Orion and exploration missions.
- Provides back-up capability for crew/cargo to ISS.

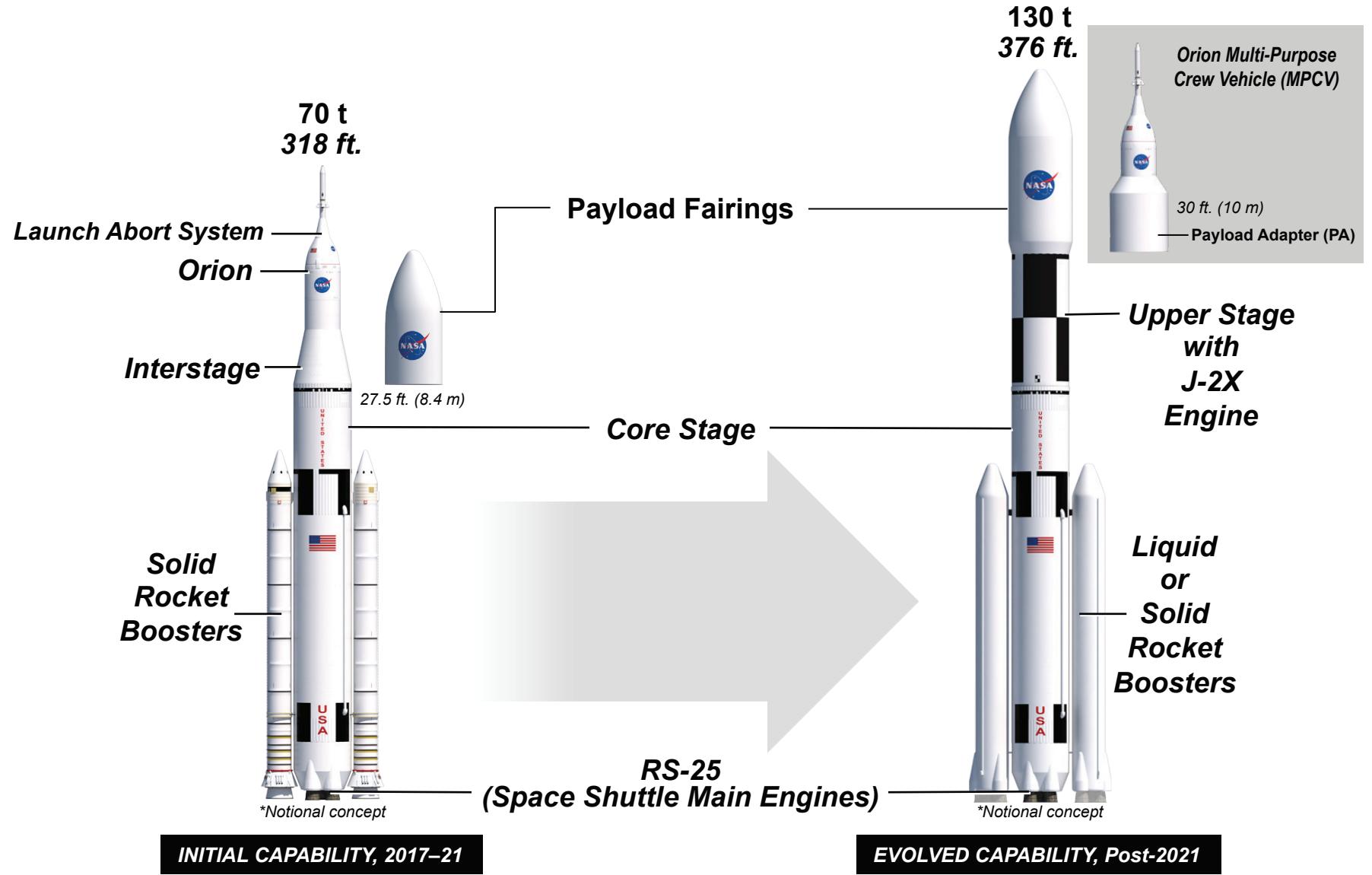
- ◆ **Evolved capability: 130 t, post–2021**

- Offers large volume for science missions and payloads.
- Modular and flexible, sized to mission requirements.



***SLS First Flight in 2017***

# SLS Architecture Uses Existing and Advanced Technologies to Fly in 2017



*Built in the U.S.A.*

# SLS Maximizes U.S. Aerospace Workforce and Capabilities



## ◆ Boosters (3-phased approach)

- Phase I: 5-segment Solid Rocket Booster in-scope modification to existing Ares contract with ATK for initial flights through 2021
- Phases II and III: Advanced Boosters
  - II: Engineering demonstration and risk reduction via NASA Research Announcement (NRA): Full and Open Competition FY12; award by FY13
  - III: Design, Develop, Test, & Evaluation (DDT&E): Full and Open Competition (RFP target FY15)

## ◆ Stages

- Core/Upper Stage: Justification for Other Than Full and Open Competition (JOFOC) to Boeing, modifying current Ares Upper Stage contract
- Instrument Unit Avionics: In-scope modification to existing Ares contract with Boeing; to be consolidated with Stages contract to Boeing



## ◆ Engines

- Core Stage Engine: RS-25 JOFOC to existing Space Shuttle contract with Pratt & Whitney Rocketdyne (PWR)
- Upper Stage Engine: J-2X in-scope modification to existing Ares contract with PWR
- Future Core Stage Engine: Separate contract activity to be held in FY12

## ◆ Spacecraft and Payload adapter and Fairing

- Initial design:
  - Adapter and Fairing design and development in-house through PDR
- Full and Open Competition to begin in FY13



*Delivers Near-Term Initial Capabilities  
and Spurs Competition for Evolved Capabilities*



# Advanced Booster Engineering Demonstration and/or Risk Reduction (ABEDRR)



## ◆ The intent of the ABEDRR effort is to:

- Reduce risks leading to an affordable Advanced Booster that meets the evolved capabilities of SLS
- Enable competition by mitigating targeted Advanced Booster risks to enhance SLS affordability

*Competitive Opportunity*



# Three-Phase Booster Development Approach



**Full and Open Competition**

## Advanced Booster Design, Development, Test, and Evaluation (DDT&E)



- Scope: Follow-on procurement for DDT&E of a new booster
- Date: RFP target is FY15
- Capability: Evolved at 130 t
- Contract: Full and Open Competition (Liquids or Solids)

**Full and Open Competition**

## Advanced Booster Engineering Demonstration And/Or Risk Reduction NRA



- Scope: Award contracts that reduce risks leading to an affordable Advanced Booster that meets the evolved capabilities of SLS and enable competition by mitigating targeted Advanced Booster risks to enhance SLS affordability  
**Issue draft NRA Dec 12, 2011; award targeted for Oct 1, 2012**
- Date:
- Capability: Leading to 130 t
- Contract: NRA Demonstrating Specific Technologies and Affordability Risk Reduction for Advanced Boosters
  - Liquid Rocket Boosters or Solid Rocket Boosters



## Booster Fly-out for Early Flights through 2021

- Scope: Build two 5-segment SRB Flight Sets
- Date: In progress
- Capability: Initial 70–100 t
- Contract: Mod to Ares contract with ATK

**Moving Forward from Initial to Evolved Capability**



## ◆ ABEDRR NASA Research Announcement (NRA):

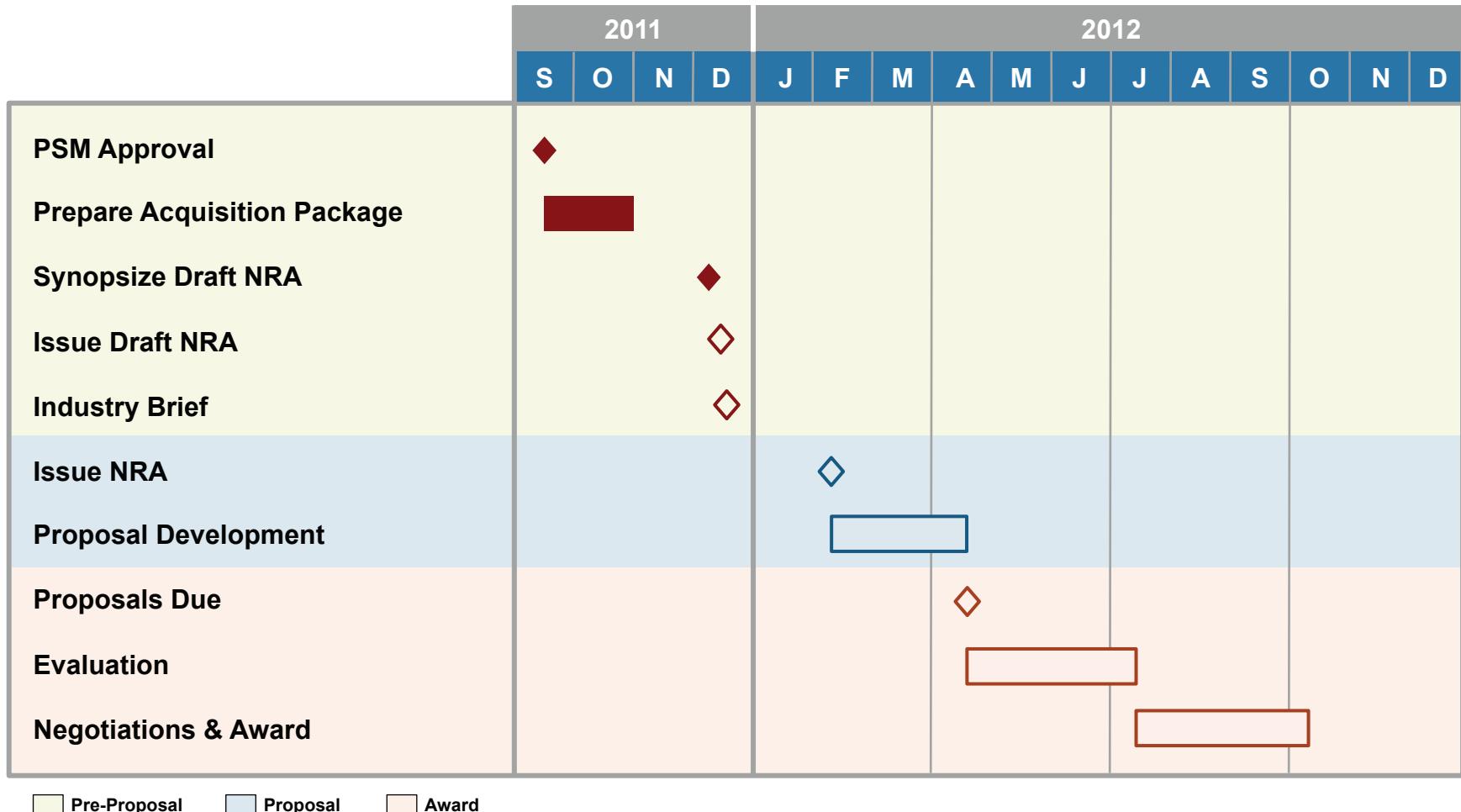
This NASA Research Announcement seeks identification and mitigation of risks for the Advanced Booster. NASA has identified potential target areas for risk reduction, however, this list is not intended to be inclusive of every risk that may need mitigating efforts. Offerors may propose other risk areas for mitigation that would be applicable to their Advanced Booster concept.

## ◆ Key Concepts

- Offerors must propose an Advanced Booster (AB) concept that meets SLS Program requirements
- Engineering Demonstration and/or Risk Reduction must relate to the Offeror's Advanced Booster concept
- NRA will not be prescriptive in defining Engineering Demonstration and/or Risk Reduction

***Seeking Maximum Performance for Minimum Investment***

# Advanced Booster Engineering Demonstration and/or Risk Reduction NRA: Timeline



**Advanced Booster Industry Day Briefing on December 15, 2011  
Marshall Space Flight Center**



- ◆ **WHEN:** Thursday, December 15th, 2011
- ◆ **WHERE:** Marshall Space Flight Center, Building 4200, Morris Auditorium
- ◆ **HOW:** Interested parties should provide the information below, via email to Ms. Kathryn Cooper at [Mary.K.Cooper@nasa.gov](mailto:Mary.K.Cooper@nasa.gov), no later than December 12, 2011:
  - Drivers License Number
  - State
  - Full Name
  - Primary Citizenship
  - Organization Visiting MSFC
- ◆ **Additional information can be found by visiting:**
  - Government Point of Entry (FedBizOpps)
  - NASA Acquisition Internet Service (NAIS)
  - NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)

***It is the potential Offeror's responsibility to monitor these sites for the release of any solicitation or synopsis.***



## ◆ With Primes:

- To be held directly after the Marshall Small Business Alliance event today in the lobby and immediately following the SLS ABEDRR Industry Day event at Marshall on Dec. 15<sup>th</sup> until 1:00 pm in the Building 4200 lobby.

## ◆ NASA Strategic Partnership Information:

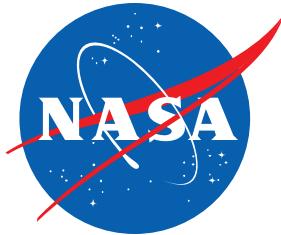
- To be available at the SLS ABEDRR Industry Day in the Building 4200 lobby.
- To be synopsized as a Special Notice today or as soon as possible.



- ◆ **SLS is a national capability that empowers entirely new exploration for missions of national importance.**
- ◆ **Program key tenets are *safety, affordability, and sustainability*.**
- ◆ **SLS builds on a solid foundation of experience and current capacities to enable a timely initial capability and evolve to a flexible heavy-lift capability through competitive opportunities:**
  - Reduce risks leading to an affordable Advanced Booster that meets the evolved capabilities of SLS
  - Enable competition by mitigating targeted Advanced Booster risks to enhance SLS affordability
- ◆ **The road ahead promises to be an exciting journey for present and future generations and we look forward to working with you to continue America's space exploration.**



**For More Information**



***[www.nasa.gov/sls](http://www.nasa.gov/sls)***

***<http://prod.nais.nasa.gov>***

**Solicitation: SLS-ABEDRR-01 for instructions on attending the  
SLS Advanced Booster Industry Day**